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September 2010

TO: **TELECOMMUNICATIONS MANAGERS**

The California Statewide Interoperability Executive Committee (CalSIEC) and California Interoperability Communications Office (CICO) are pleased to provide you with the updated California Emergency Services Radio System (CESRS) Plan. Important updates have been made to the plan. The plan now reflects the CalSIEC's role in providing oversight of the system and includes a streamlined application process and new application forms.

An important issue over the next two years is that of Narrowbanding. The Federal Communications Commission (FCC) has mandated that all non-Federal public safety licensees operating 25 kHz radio systems in the 150-174 MHz and 421-512 MHz bands (the VHF and UHF bands) migrate to more efficient 12.5 kHz (narrowband) channels by January 1, 2013. In other words, the FCC will no longer allow the use of wideband on VHF and UHF public safety frequencies, including the CESRS channels, from December 31, 2012 on and will not automatically issue new licenses.

Cal EMA will release further information on the transition of interoperability channels from wideband operations to narrowband operations, including effective dates and policy changes, in the near future.

Your input is very important to us. Please email all feedback, comments, and questions on the updated CESRS Plan to Interop@calema.ca.gov.

NOTE: The CalSIEC and CICO strongly encourage all entities licensed to use CESRS to apply for a modification to their existing FCC license(s) as soon as possible. This is crucial to comply with the new narrowband licensing requirements and to ensure interoperability with agencies that have already transitioned to narrowband.

John Penido
CalSIEC Chair

Michael Crews
Statewide Interoperability Coordinator

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CALIFORNIA EMERGENCY SERVICES RADIO SYSTEM (CESRS)

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Overview

The California Emergency Services Radio System (CESRS) serves as an emergency communications system for the California Emergency Management Agency (Cal EMA) and county emergency services organizations. In addition to supporting emergency operations, CESRS may be used on a day-to-day basis for the transmission of communications relating to the administrative functions of the county's emergency services office.

Statewide communications are provided through a number of microwave interconnected mountaintop relays. Cal EMA has base stations at its headquarters in Mather and in each regional emergency operating center.

System Management

CESRS operates under appropriate FCC Rules and Regulations and is administered by the State of California through Cal EMA. The California Statewide Interoperability Executive Committee (CalSIEC) exercises general supervision and disciplinary control.

Eligibility

Cal EMA is the primary agency eligible to operate on CESRS.

County level emergency services offices are also eligible to participate in CESRS, provided that FCC licenses have been obtained. They are authorized to:

- Purchase base station equipment to operate on the frequency, provided the county complies with the system agreement and equipment specifications as detailed in this plan.
- Operate mobiles and/or handhelds, provided these units are assigned to the office directly responsible for the day-to-day administration of the county's emergency services.

Cal EMA may extend CESRS to other agencies on a case by case basis. For more information, please contact the Cal EMA Telecommunications Duty Officer (TDO) at (916-845-8911 or warning_center@oes.ca.gov).

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Application Procedure

There are two types of applications, one for mobiles and another for fixed stations. Authorization to transmit on one frequency does not imply authorization for the other channels in the system.

FCC licenses are acquired by and in the name of the State of California.

Charges are levied on all applicant organizations when seeking a new frequency or making a license change, system modification, or any other technical change which requires an official FCC license modification or transaction to take place.

For more details on the fee structure and process, please visit the Public Safety Communications Division (PSCD) website or contact the Frequency Coordination and Licensing Unit at **(916) 657-6153**

<http://www.cio.ca.gov/PSCD/Services/PubSafety/default.htm>

Mobiles Only

1	Draft a “letter of intent” (LOI) on your agency letterhead The letter should contain information on the requested channels, proposed site(s) and area of operations. If the system is to serve more than a single political entity, provide additional details such as a list of all individuals responsible for the project.
2	Fill out the license request forms at the end of the plan As needed, contact the California Interoperability Coordinator's Office (CICO) or Cal EMA TDO for further assistance.
3	Send the LOI and completed form(s) via postal mail or email to the CICO California Emergency Management Agency Attn: California Interoperability Coordinator's Office 3650 Schriever Avenue Mather, CA 95655 Email: @calema.ca.gov
4	Program Radios Requestors may program channels into radios but may not transmit until final FCC authorization is received. Contact the PSCD FCC Unit at (916) 657-6153 for a status on FCC authorization.

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Fixed Sites

Fixed sites require extensive coordination on the part of the requestor to minimize interference with neighboring jurisdictions. Use of the interoperability spectrum requires oversight and endorsement from the CalSIEC before any license request can be approved.

1	Draft a LOI on your agency letterhead The letter should contain information on the requested channels, proposed site(s) and area of operations. If the system is to serve more than a single political entity, provide additional details such as a list of all individuals responsible for the project.
2	Fill out attached license request form As needed, contact the CICO or Cal EMA TDO for further assistance.
3	Send the LOI and completed form(s) via postal mail or email to the CICO California Emergency Management Agency Attn: California Interoperability Coordinator's Office 3650 Schriever Avenue Mather, CA 95655 Email: @calema.ca.gov
4	Develop a proposal package The proposal package should include coverage plots, applicable frequencies and channels, and other supporting documents. Supporting documents include Standard Operating Procedures, letters of recommendations or endorsements from neighboring jurisdictions, and/or concurrence from regional frequency coordination groups. The CICO and TDO will be available to assist with the coordination process.

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Submit proposal package for CalSIEC Planning Area Review and Endorsement

The application proposal package will require an endorsement letter from the requesting agencies respective CalSIEC Planning Area (the table below lists the counties in each Planning Area).

The CICO and TDO will be available to assist with the coordination process.

North	Capitol/Bay	Central	Southern
Butte	Amador	Fresno	Kern*
Colusa	Alameda	Kern*	Imperial
Del Norte	Alpine	Kings	Inyo
Glenn	Calaveras	Madera	Los Angeles
Humboldt	Contra Costa	Mariposa	Mono
Lake	El Dorado	Merced	Orange
Lassen	Marin	Tulare	Riverside
Mendocino	Monterey		San Bernardino
Modoc	Napa		San Diego
Nevada	Placer		San Luis
Plumas	Plumas		Obispo
Shasta	Sacramento		Santa Barbara
Sierra	San Benito		Ventura
Siskiyou	San Francisco		
Sutter	San Joaquin		
Tehama	San Mateo		
Trinity	Santa Clara		
Yuba	Santa Cruz		
	Solano		
	Sonoma		
	Stanislaus		
	Tuolumne		
	Yolo		

**Because it encompasses both sides of the mountain range that separates the Central Valley and Southern California, Kern participates in both Central and Southern Planning Areas.*

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Forward the CalSIEC Planning Area endorsement letter to the State Interoperability Coordinator

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7	<p>CalSIEC Formal Review</p> <p>Following the CalSIEC Planning Area endorsement, the CICO will forward the package to the CalSIEC Standing committees for review.</p> <p>Following the review, the application will go to the CalSIEC chairs for final endorsement.</p> <p>The CalSIEC endorsement letter will be forwarded to the PSCD FCC unit for administrative processing.</p>
8	<p>Program Radios/Equipment</p> <p>Requestors may program channels into radios but may not transmit until final FCC authorization is received.</p> <p>Contact the PSCD FCC Unit at (916) 657-6153 for a status on FCC authorization.</p>

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Operational Standards

Permissible Communications

CESRS channels are for official use only.

All communications on CESRS are in accordance with Part 90, Subpart B of FCC Regulations (Public Safety Radio Pool). Unofficial communications on CESRS are prohibited and may result in revocation of licensee authorization.

Channel Identifiers

Only the Standard California Channel Identifiers are used for CESRS. It is strictly prohibited to assign a local identifier to a mutual aid channel.

Monitor First

Personnel must monitor the CESRS channel prior to transmitting to minimize the possibility of interference with communications in-progress.

Identification

Mobile Units

1. Mobile units identify the unit or station they wish to contact and identify themselves by using their agency-assigned unit designator. These are not shortened and include the entire set of letters and/or numbers.
 - **For example: “Fremont Engine 51, this is Cal Fire Battalion 1614.”**
2. During interagency operations, mobile units identify their agency in addition to their agency-assigned unit designator.
 - **For example: “CHP 58-501C, this is Sacramento 6 Paul 20.”**

Base Stations

Base stations identify themselves by using their agency name along with any other usual identifier. Base stations must use the FCC call sign shown on their CESRS license at least once every 30 minutes or at the end of a contact.

Channel Use Priorities

CESRS use is governed by a system of priorities that must be respected at all times. When a higher priority use is required, all lower priority traffic yields the frequency immediately.¹

- **Priority 1:** Disaster and extreme emergency operations for mutual aid and interagency communications
- **Priority 2:** Emergency or urgent operations involving imminent safety of life or protection of property
- **Priority 3:** Special event control activities, such as a planned event involving the participation of two or more agencies
- **Priority 4:** Drills, tests and exercises
- **Priority 5:** Single agency secondary communications

¹ Please note that this 2010 update of the CESRS plan has changed the original numbering of the Priorities from 1, 2, 3, 3A, 4 to Priorities 1 through 5.

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Notification of Priority Traffic (Priority 1, 2, 3, 4)

- Plain language must be used when “clearing” a CESRS channel for use in high priority situations.
- Agencies inform other area user agencies when they are involved in high priority usage of CESRS channels by phone or email.
- Notify the Cal EMA Warning Center of high priority usage via phone (916-845-8911) or email (warning_center@oes.ca.gov).
- If two or more agencies in close proximity request a similar priority level clearance for simultaneous operations, contact the Cal EMA TDO (916-845-8911 or warning_center@oes.ca.gov) for guidance.

Emergency Management Agency Staff Secondary Communications (Priority 5)

In the absence of Priority 1, 2, 3, and 4 situations, CESRS channels may be used for day-to-day communications of administrative nature for local emergency services offices. There are specific limitations relative to such use:

- Before using the channel for secondary communications, agencies should first monitor the channel to ensure that no higher-priority communications are being conducted on CESRS.
- The use conforms to the operational standards outlined in this plan (identification, call signs, plain language, etc.)
- Agencies must immediately vacate the channel if it needs to be used for a Priority 1, 2, 3, or 4 situation.

Message Precedence

Message Precedence is a classification system that establishes the priority of message content while a channel is in use – i.e., it helps determine which message has precedence over another on a channel. It is used for both verbal and written message traffic. The order of precedence of messages is:

1. **New Incident:** Messages pertaining to a new incident. Once the new incident is addressed, it no longer has precedence unless it has a higher priority.
2. **Emergency:** Messages involving the imminent safety of life or protection of property, including messages to request supplies, materials or instructions vital to relief of emergency operations.
3. **Priority:** Messages that are official and time-bound, but are not covered in the emergency category. Priority messages may include notice of deaths or injury in a disaster area.
4. **Welfare:** Messages involving the health and welfare of an individual in a disaster area.
5. **Routine:** Messages pertaining to routine operations.

Plain Language

All communications on CESRS are in plain language. Radio codes, acronyms, and abbreviations are to be avoided as they may cause confusion between agencies and disciplines, and could jeopardize emergency responder safety.

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Voice Privacy

The use of any CESRS channel for transmission of encoded, encrypted, digital, or scrambled messages is prohibited. However, under special circumstances, a one-time waiver may be granted to allow for encryption. All inquiries and requests for waivers should be addressed to the Cal EMA TDO (916-845-8911 or tcomm.duty.officers@oes.ca.gov).

Interoperability Operation

In the event of a public safety Priority 1 or 2 emergency, and in keeping with appropriate FCC Rules, CESRS may be *temporarily* cross-banded through automatic or manual equipment with another channel. A cross-band or use of a gateway switch must be discontinued when the operation requiring its use is finished. Refer to Cal EMA's Statewide Gateway Units Standard Operating Procedure for more information on gateway procedures.

Supervisory Responsibility

Each agency manager and supervisor bears the responsibility for the compliance of operations on CESRS to the CESRS Plan. Violations are reported to Cal EMA who works with each agency's executives to correct reported problems. See Appendix E for the complaint procedure.

Technical Standards and Procedures

Statewide communications are provided through a number of microwave interconnected VHF mobile relays that are strategically located at selected mountaintop sites throughout the State. The State Microwave System is divided into five routes running from the microwave switching center in Sacramento. Since all mountaintop repeaters (mobile relays) operate on the same frequencies, a single base station may have access to more than one mountaintop site; therefore, the relays are designed to respond to a particular single-tone code selected by the operator of the base station to prevent dual keying. Most of these mobile relays can be interconnected to the State Microwave System by using a touchtone type encoder, providing statewide communications. A station equipped with a touchtone encoder may gain access to the microwave system through a VHF mobile relay and exit through a distant VHF mobile relay which is part of CESRS. On the following page is a technical reference table of the CESRS mountaintop sites.

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VHF High Band					
ID	Rx Freq	CTCSS	Tx Freq	CTCSS	Notes
CESRS	153.7550 W	192.8	154.9800 W	Multiple (see table below)	Mountaintop mobile relays. Mode: Analog till late 2011, then mixed
CESRSD	153.7550 W	None	153.7550 W	None	Direct communications. Equipment: Allowed for mobiles (installed semi-permanently in a vehicle) and portables (handhelds). Base stations are NOT authorized. Power: 110 Watts maximum output. Mode: Analog

- Equipment (base stations and mobile units) must be in compliance with the standards established by the State to ensure compatibility with the System.
- Each radio must be able of transmitting in direct and repeat mode.
- CESRS uses the continuous tone-coded squelch system (CTCSS) method of operation. When a receiver operates in this mode, only stations which transmit using the same CTCSS tone will be heard. The transmitter must be equipped with multiple CTCSS tones in order to operate statewide. The operator must be able to select multiple CTCSS tones from their operating position.
- Currently, some base station transmitters still have a single ("burst")-tone code select switches with six positions. These comprise tones one through five, each selectable by the operator as required for VHF mobile relay activation, and an "off" position. This equipment provides access to all base stations and mobile unit within the coverage area of mobile relays in the operating range of a base station or mobile unit. The six positions are:

POSITION Hz

1.	1800	5.	2552
2.	2000	6.	OFF
3.	2200	7.	OFF
4.	2400		

By mid 2011, these tones will be removed from the repeaters and only CTCSS will be utilized.

In order to talk statewide or to neighboring regions and jurisdictions, radios require a dual-tone multi-frequency (DTMF) encoder, to interconnect the mobile relays to the microwave system at the point of entry and point of exit.

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Essential Interoperability Guidelines Checklist

- ✓ **OBEY PRIORITIES:** When a higher priority use is required, all lower priority traffic yields the frequency immediately.
- ✓ **USE PLAIN LANGUAGE AT ALL TIMES.**
- ✓ **IDENTIFY WITH FULL AGENCY UNIT DESIGNATOR AND FCC CALL-SIGNS (BASE STATIONS AND MOBILES).**
- ✓ **MONITOR THE CHANNEL PRIOR TO TRANSMITTING.**
- ✓ **USE APPROPRIATE CODED SQUELCH:** Do not use local tones on interoperability channels without the capability of monitoring the mutual aid tone (156.7/\$293) and turning the tone protection off.
- ✓ **USE THE CHANNEL'S STANDARD ID:** Program the standard California channel ID into your radio's display.
- ✓ **DO NOT SCRAMBLE OR ENCRYPT MESSAGES.**
- ✓ **DO NOT PERMANENTLY OR SEMI-PERMANENTLY LINK MUTUAL AID CHANNELS TO EACH OTHER OR TO LOCAL AGENCY CHANNELS.**

Respect the policies and procedures set forth in each interoperability system's plan to ensure the interoperability channels are available for use in emergency situations.

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Appendix A: Complaint Procedure

Report all operations on mutual aid channels that are detrimental to officer safety or to the management of an incident, which fail to follow the procedures outlined in this mutual aid plan, which cause interference to other users, or that violate FCC Regulations 90.20 and 90.405.

To report flagrant violations that endanger officer of peace safety, immediately contact the LDO via the California State Warning Center (CSWC) (Telephone: 916-845-8911).

To report interference issues from outside sources and other misuses of mutual aid channels:

1. Attempt to identify the offending station.
2. Contact the chief executive of that department.
3. If the problem persists, contact the Cal EMA LDO via the CSWC (916-845-8911 or warning_center@oes.ca.gov) and relay:
 - The date and time of the problem
 - The circumstances regarding the interference or misuse
 - Information detailing how the misuse interfered with operations or safety
 - Information (identification, call signs, etc.) that would help locate the offending agency.
4. Keep audio logging tapes, tape cassettes, or digital files recording the misuse to send to Cal EMA. [If requested, Cal EMA will return the tape after its investigation.] On receipt of a complaint, Cal EMA will conduct an investigation.

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Appendix B: Acronym List

AES: Advanced Encryption Standard

ANSI: American National Standards Institute

CALCORD: California On-Scene Emergency Coordination System

Cal EMA: California Emergency Management Agency

CalSIEC: California Statewide Interoperability Executive Committee

CICO: California Interoperability Coordinator's Office

CSWC: California State Warning Center

CTCSS: Continuous Tone-Coded Squelch System

DCS: Digital Coded Squelch

DES: Data Encryption Standard

DVP: Digital voice privacy

FCC: Federal Communications Commission

NAC: Network Access Code

NPSTC: National Public Safety Telecommunications Council

PSCD: Public Safety Communications Division

TDO: Telecommunications Duty Officer

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Appendix C: CESRS Repeater Frequencies Table

Site #	Transmitter		Receiver		Location
	Freq	CTCSS	Freq	CTCSS	
1	153.755	(16) 192.8	154.980	(6) 156.7	MT. DIABLO
2	153.755	(16) 192.8	154.980	(1) 110.9	MT. LUKENS
3	153.755	(16) 192.8	154.980	(2) 123.0	MT. ZION
4	153.755	(16) 192.8	154.980	(4) 136.5	BLACK MTN
5	153.755	(16) 192.8	154.980	(1) 110.9	ANTELOPE PEAK
6	153.755	(16) 192.8	154.980	(3) 131.8	HATCHET MTN
7	153.755	(16) 192.8	154.980	(4) 136.5	HOUGH MTN
8	153.755	(16) 192.8	154.980	(1) 110.9	LIKELY MTN
9	153.755	(16) 192.8	154.980	(3) 131.8	SHAFFER
10	153.755	(16) 192.8	154.980	(1) 110.9	BLOOMER
11	153.755	(16) 192.8	154.980	(3) 131.8	BOREAL RIDGE
12	153.755	(16) 192.8	154.980	(5) 146.2	ROUND MTN
13	153.755	(16) 192.8	154.980	(4) 136.5	MT HAUSER
14	153.755	(16) 192.8	154.980	(1) 110.9	LOMA PRIETA
15	153.755	(16) 192.8	154.980	(2) 123.0	FREMONT PK.
16	153.755	(16) 192.8	154.980	(3) 131.8	MT. LOWE
17	153.755	(16) 192.8	154.980	(4) 136.5	RED MTN (Ventura)
18	153.755	(16) 192.8	154.980	(3) 131.8	CUYAMACA
19	153.755	(16) 192.8	154.980	(2) 123.0	STRAWBERRY PK
20	153.755	(16) 192.8	154.980	(3) 131.8	MT TAMALPAIS
21	153.755	(16) 192.8	154.980	(5) 146.2	MT. ST. HELENA
22	153.755	(16) 192.8	154.980	(4) 136.5	LAUGHLIN RIDGE
23	153.755	(16) 192.8	154.980	(2) 123.0	MT. PIERCE
24	153.755	(16) 192.8	154.980	(1) 110.9	RED MTN (Del Norte)
25	153.755	(16) 192.8	154.980	(4) 136.5	SCOUT PK
26	153.755	(16) 192.8	154.980	(2) 123.0	PINE GROVE
27	153.755	(16) 192.8	154.980	(1) 110.9	SHERWIN SUMMIT
28	153.755	(16) 192.8	154.980	(13) 141.3	PACHECO PK
29	153.755	(16) 192.8	154.980	(12) 127.3	SODA CREEK RIDGE
30	153.755	(16) 192.8	154.980	(14) 151.4	CAHTO PK
31	153.755	(16) 192.8	154.980	(15) 162.2	TELEGRAPH HILL

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Appendix D: CESRS Microwave Routes Table

Microwave Routes with Access Codes	Site Location	County	Burst and/or CTSS Tone	DTMF Dial In	DTMF Dial Out
South Valley - 850	Mt. Zion	Amador	2	242	2422
	Telegraph Hill +	Tuolumne	15*	N/A	N/A
	Black Mt.	Fresno	4	252	2522
	Round Mt.	Kern	5	253	2532
	Mt. Lukins	Los Angeles	1	202	2022
	Mt. Hauser	Los Angeles	4#	N/A	N/A
South Coast - 853	Loma Prieta Peak	Santa Clara	1	223	2232
	Pacheco Peak +	San Benito	13*	N/A	N/A
	Williams Hill	Monterey	2	222	2222
	Mt. Lowe	San Luis Obispo	3	204	2042
	Red Mt.	Ventura	4	203	2032
	Strawberry Peak	San Bernardino	2#	264	2642
	Cuyamaca Peak	San Diego	3	265	2653
North Valley - 851	Bloomer Mt.	Butte	1	232	2322
	Sugarloaf Mt.	Shasta	2	233	2332
	Antelope Mt.	Siskiyou	1	234	2342
	Soda Creek Ridge +	Siskiyou	12*	N/A	N/A
	Hatchet Mt.	Shasta	3*	N/A	N/A
	Likely Mt.	Lassen	1	235	2352
	Shaffer Mt.	Lassen	3	236	2362
	Hough Mt.	Plumas	4	237	2372
North Coast - 852	Boreal Ridge	Nevada	3*	N/A	N/A
	Mt. St. Helena	Sonoma	5	224	2242
	Mt. Tamalpais	Marin	3*	N/A	N/A
	Mt. Diablo	Contra Costa	6*	N/A	N/A
	Laughlin Ridge	Mendocino	4	225	2252
	Cahto Peak +	Mendocino	14*	N/A	N/A
	Mt. Pierce	Humboldt	2	227	2272
	Red Mt.	Del Norte	1	228	2282
East Sierra - 854	Scout Peak	El Dorado	4	243	2432
	Pine Grove	Lyon (Nevada)	2	266	2662
	Sherwin Summit	Mono	1	262	2622

* Independent, and not on the microwave circuit. Use CTSS Tone only. Burst Tone and DTMF will not work.

+ These sites have been provided by CalFIRE.

No CTSS at this site. Use Burst Tone or DTMF.

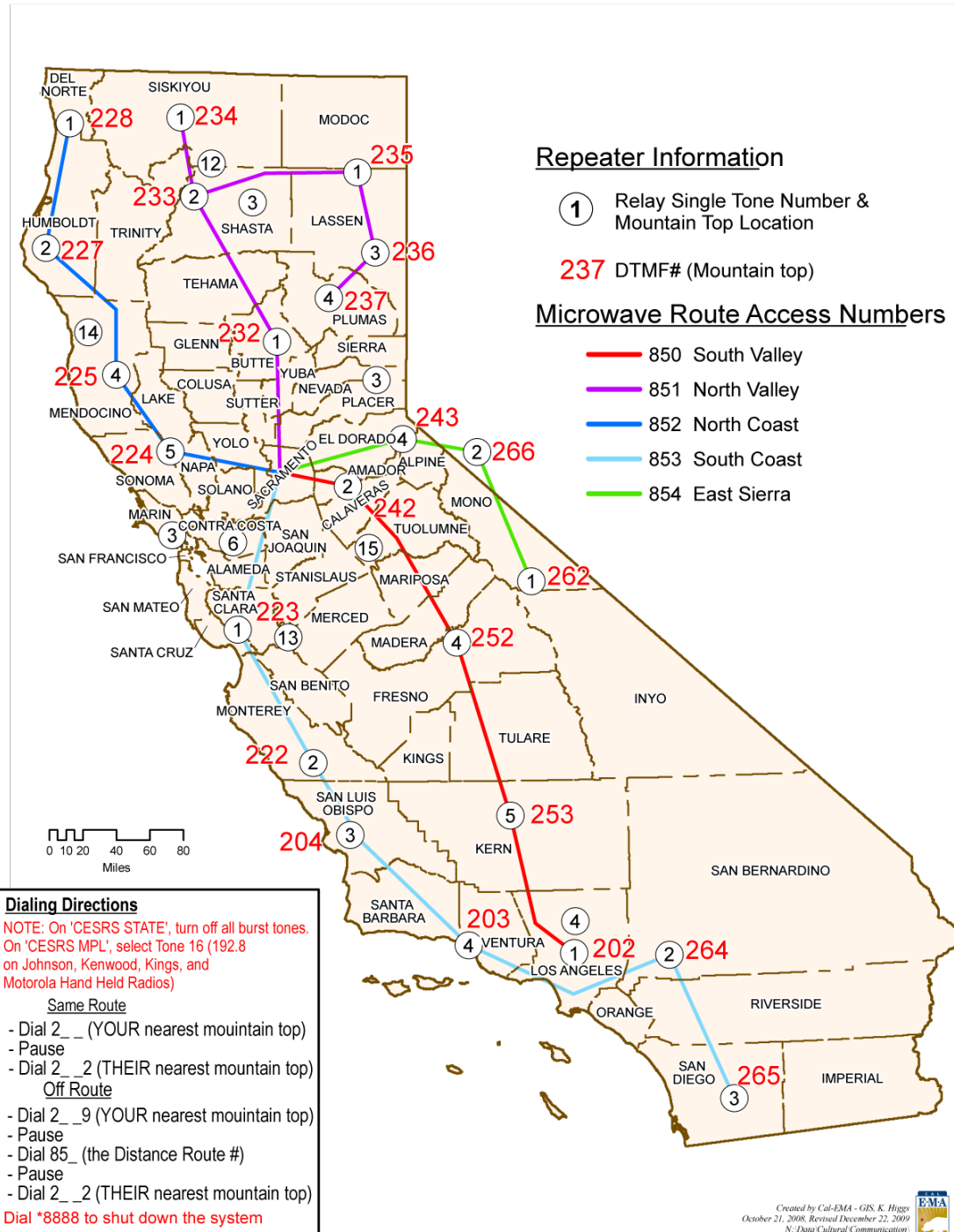
Base/Mobile/Portable Radio CTSS Standard Transmit Tones (in Hz): Tone 1 – 110.9, Tone 2 – 123.0, Tone 3 – 131.8, Tone 4 – 136.5, Tone 5 – 146.2, Tone 6 – 156.7, Tone 12 – 127.3, Tone 13 – 141.3, Tone 14 – 151.4 and Tone 15 – 162.2. And, all Receive tone6 – 192.8.

Burst Tones: Tone 1 – 1800, Tone 2 – 2000, Tone 3 – 2200, Tone 4 - 2400 and Tone 5 – 2552.

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Appendix E: CESRS Routing Map

CESRS ROUTING AND DIALING for use with State Vehicle Radios



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Placeholder for:

APPLICATION AND AGREEMENT